MASTERARBEIT

Forschungsinstitut für biologischen Landbau
Institut de recherche de l'agriculture biologique
Research Institute of Organic Agriculture
Istituto di ricerche dell'agricoltura biologica
Instituto de investigaciones para la agricultura orgánica

Master Thesis at FiBL Soil Science Division

Title	**Participatory organic cotton breeding in India (Madhya Pradesh)**
Context	Organic cotton farming presents a viable and healthy alternative for small holders. However, involved producers are facing increased difficulties in finding suitable and adapted cultivars. Indeed, only few hybrids, selected for high input farming of genetically-modified (GM) cotton, which is explicitly excluded in organic farming, are dominating the seed market. Up to 80% of the world's organic cotton is produced in India with an increasing number of organic cotton projects throughout the country. Conversely in 2010, more than 80% of India's cotton area is grown with GM Bt-cotton (Nemes 2010) and by 2011 this has increased to 90%. Since the market for non-GM seed has become completely eroded, there is little interest by private seed companies to further invest in this sector. On the other hand, farmers have lost their traditional knowledge on seed production. Hybrid seeds have to be purchased each season and therefore organic cotton farmers rely nowadays on a diminishing supply market of non-GM cotton seeds. Recent experience has been that available non-GM seeds is of dubious quality (expired, chemically pre-treated, segregating) and based on a few hybrids only selected for responsiveness to fertilizer and chemical pest control that might not be adapted to rain-fed and low input conditions (Felkl and Sahai 2010). While new cultivars are tested routinely under conventional growing conditions (Surulivelu 2011; Rathore and Palve 2011), no systematic variety trials have been conducted for organic and low input growing conditions. This thesis aims at evaluating different types of cotton cultivars for their suitability for organic and low input farming in Central India combing on-station trials with on-farm participatory trials. The project is supported by the Research Institute of Organic Agriculture (FiBL) and local partners in India (bioRe India, University of Agricultural Science (UAS) Dharwad) and is a continuation of a program started in 2011. The main goal of this study is to optimize the participatory breeding approach under organic and low input conditions in India. › Evaluation of different cultivars types (varietal lines vs. hybrids) and *Gossypium* species (*hirsutum* (4x) vs. *arboreum* (2x)) under different farming systems, different input regimes and plant densities › Identification of optimal plant type and plant density for low input conditions › Establishing participatory breeding approaches together with farmers › Implementation of participatory selection of F2 lines and F3 lines
Procedure/ Method	On-station and on-farm field trials, morphological, agronomic and quality assessment, semistructural farmers interviews, documentation, statistical analysis and interpretation of data

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Location	FiBL, Frick, Kanton Aargau www.fibl.org **bioRe India Ltd, Madhya Pradesh, India**
Language	English
Literature	Eyhorn F., Mäder P., Ramakrishnan M., (2005a). The Impact of Organic Cotton Farming on the Livelihoods of Smallholders. Evidence from the Maikaal bioRe project in central India. Research Institute of Organic Agriculture FiBL, Frick, Switzerland. Eyhorn F., Ratter S.G., Ramakrishnan M., (2005b). Organic Cotton Crop Guide. A manual for practitioners in the tropics. Research Institute of Organic Agriculture FiBL, Frick, Switzerland. Eyhorn F., Ramakrishnan M., Mäder P., (2007) The viability of cotton-based organic farming systems in India. INTERNATIONAL JOURNAL OF AGRICULTURAL SUSTAINABILITY 5(1) 2007, Pages 25–38 Felkl G., Sahai S., (2010). Potentials of agricultural genetic engineering for food security in India - experiences and perspectives, Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ), Eschborn. Howard P.H., (2009). Visualizing Consolidation in the Global Seed Industry: 1996–2008. Sustainability 2009, 1, 1266-1287. Nemes N., (2010). Seed Security among Organic Cotton Farmers in South India. Universität Hohenheim, Germany. Pay E., (2009). The market for organic and fair-trade cotton fibre and cotton fibre products. Food and Agriculture Organization (FAO), Italy. Preisel S.R. (2011) Strategies and Selection Criteria for Participatory Cotton Breeding in Uganda A Diagnostic Study, M.Sc. Thesis Report Plant Breeding and Genetic Resources, University of Wageningen. Surulivelu T., (2011). All India Coordinated Cotton Improvement Project – Annual Report (AICCIP) 2010-11. Central Institute for Cotton Research, Coimbatore, India. Rathore P., Palve S.M., (2011). Proceedings of the AICCIP annual group meeting: 2011-12. Breeding Panel: Technical programme for 2011-12. India. Truscott L., Lizarraga A., Nagarajan P., Tovignan S., Currin A., (2010). 2010 FARM & FIBER REPORT - Organic by Choice. TextileExchange.